

nished daily from the Signal Office at Washington to the various stations in the state during the month, was for the state: weather, 84.4 per cent.; and temperature, 85.6 per cent.

The following is from the report of the "Nebraska Weather Service:—"

The daily predictions of the Chief Signal Officer have been distributed by this service to upwards of fifty stations, partly by mail and partly by telegraph, and arrangements are being made to increase the list of such stations. The value of this service is evinced by the increasing number of places desiring the predictions. The percentage of correct predictions for December is 87; 86 for weather, and 88 for temperature.

STATE WEATHER SERVICES.

The following extracts are republished from reports for December, 1887, of the directors of the various state weather services:

The "Alabama Weather Service," P. H. Mell, jr., of the Agricultural and Mechanical College, Auburn, director:

Very few days in the month were clear and pleasant. The period was generally cloudy, with frequent occurrence of rains, making December the wettest month of the year. The excess of precipitation over the normal was 4.99 inches. This unusual rainfall was rendered necessary to fill up the deficiencies in the first and second quarters of the year. Even with this heavy fall, however, the annual precipitation is below the average 10.53 inches. The temperature was 3° below the normal. There were four cold waves predicted for the month, viz., on the 5th, 19th, 21st, and 28th. The one predicted for the 19th failed to make its appearance. The others came as indicated, and although the reduction of temperature was unpleasant, still the waves were not severe for the season of the year.

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.15; maximum observed, 30.74, at Auburn, on the 1st; minimum observed, 29.48, at Montgomery, on the 24th; range for state, 1.26.

Temperature (in degrees Fahr.).—Monthly mean, 45° 9'; highest monthly mean, 58° 6', at Newton; lowest monthly mean, 38° 6', at Chattanooga; maximum, 78°, at Greenville, on 6th; minimum, 10°, at Gadsden, on the 29th; range for state, 68°; greatest local monthly range, 51°, at Greenville; least local monthly range, 38°, at Newton.

Precipitation, including melted snow (in inches).—Average for the state, 9.84; greatest, 15.95, at Mount Willing; least, 5.46, at Chattanooga, Tenn.

Winds.—Prevailing direction, southeast.

The "Monthly Review of the Illinois Weather Service," Col. Charles F. Mills, Springfield, director:

The general meteorological features of the month were not very unusual. The changes in pressure, with two exceptions, were not great, but were quite numerous. The daily isobars, or lines of equal pressure, were very irregular, and only few symmetrical "highs" or "lows" were formed. The "highs" of the 21st, 22d, 28th, and 29th, and the "low" of the 31st were the most notable; especially the last two which were each the extreme of its class during the month. From the 29th, when the barometer at Springfield was 30.76, to the 31st, when it was 29.44, the fall was 1.32 inches, a very unusual one in such a brief period of time. The month opened with a very high barometer and ended with a very low one.

The mean temperature of the month for the state was 1° above the mean of ten years, the excess being greater in the northern division, where it was 1° 9', and least in the southern, where it was only 0° 4'.

The precipitation for the month was also above the average of ten years, 1.08 inches for the state, 1.63 inches for the northern, and 0.04 of an inch for the southern division.

The "Indiana Weather Service," Prof. H. A. Huston, of Purdue University, Lafayette, director:

The barometric pressure during the month was slightly below the normal for the state, and subject to rapid and great oscillations, especially so on the 3d, 11th, 17th, 20th, 27th, and 30th. Exceedingly high readings were noted on the 1st and 30th, while the lowest occurred on the 31st.

The temperature was nearly normal; a uniformly cool temperature prevailed, only interrupted by a warm period on the 3d and 4th; the lowest temperatures prevailed on the 22d, 29th, and 30th; the temperatures during the latter dates reached below zero.

The precipitation was slightly in excess; heavy rains occurred on the 3d and 4th, and quite a heavy and steady rainfall on the 31st was preceded during the afternoon and evening of the 30th by heavy snows at many stations.

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.138; maximum observed, 30.800, at Lafayette, on the 29th; minimum, 29.520, at Worthington, on the 31st; range for state, 1.280; greatest local range, 1.264, at Mount Vernon; least local range, 1.050, at Vevay.

Temperature (in degrees Fahr.).—Monthly mean, 30.3; highest monthly mean, 36.1, at Marengo; lowest monthly mean, 26.8, at La Grange; maximum, 60.0, at Rockville, on the 4th; minimum, -9.0, at Lafayette, on the 29th; range for state, 57.1; greatest local monthly range, 64.0, at Richmond, Lafayette, and Logansport; least local monthly range, 49.0, at Fort Wayne.

Precipitation, including melted snow (in inches).—Average for the state, 3.76; greatest, 7.23, at Marengo; least, 2.30, at Crawfordsville.

Wind.—Prevailing direction, southwest.

The "Louisiana State Weather Service," in charge of R. E. Kerkam, Sergeant, Signal Corps, at New Orleans:

The mean temperature of the month for the state, 49° 6', was 1° 9' below the December normal for the past seventeen years, in which period the lowest December mean, 42° 6', occurred in 1876, and the highest, 57° 9', in 1875. There were but few Decembers in the above-named period in which the mean temperature was below that of the past month. The mean temperature of the northern section was 46° 8', and of the southern section, 51° 8'. The maximum temperature, 77°, was reported from Donaldsonville and New Iberia on the 4th, and from New Orleans on the 7th. The minimum temperature, 20°, was reported from Shreveport, on the 21st. The mean daily range of temperature for the state was 13.9. The greatest daily range, 32°, was reported from Delta on the 6th, and the least daily range, 2°, from Monroe on the 16th.

The average precipitation for the state for the past month, 7.34 inches, was 2.04 inches above the December average of the past seventeen years, in which period it was exceeded but twice—1872, 7.56 inches, and 1884, 18.31 inches. The average for the northern section, 7.16 inches, was 1.54 inches above, and for the southern section, 7.51 inches, was 2.45 inches above the December normal. The average number of days on which measurable precipitation fell was fourteen, consequently the distribution was regular throughout the month, the heaviest general rains occurring on the 23d-24th.

The prevailing direction of the wind was from the north in the northern section, and from the northeast in the southern section. The average total movement of wind for the state was 5,354 miles, making an average hourly velocity of 7.2 miles. The highest velocities occurred on the 31st at all the stations reporting—the maximum reported being 36 miles per hour, from the west, at Vicksburg.

A mean relative humidity of 88 per cent. for the month is deduced. This is over 11 per cent. above the December normal.

Summary.

Temperature (in degrees Fahrenheit).—Monthly mean, 49.6; highest monthly mean, 52.9, at New Orleans; lowest monthly mean, 45.4, at Shreveport; maximum, 77, at Donaldsonville and New Iberia on the 4th, and at New Orleans, on the 7th; minimum, 20, at Shreveport, on the 21st; range for state, 57; greatest local monthly range, 54, at Shreveport; least local monthly range, 40.4, at Grand Coteau; greatest daily range, 32, at Delta, on the 6th; least daily range, 2, at Monroe, on the 16th.

Precipitation, including melted snow, (in inches).—Average for the state, 7.34; greatest, 8.26, at New Iberia; least, 6.56, at Liberty Hill.

Wind.—Prevailing direction, northeast.

The "Michigan Weather Service," N. B. Conger, Sergeant, Signal Corps, Lansing, director:

The meteorological features of the state are based upon reports received from seventy-eight voluntary, and eight United States Signal Service observers.

Atmospheric pressure (in inches and hundredths).—The mean monthly pressure is 30.06. The mean pressure for each section is, this month, nearly the same, the greatest difference occurring in the southern section. The area of high pressure, which was central over Michigan on the a. m. of the 1st passed rapidly eastward, and was followed by a low area which was central over the state on the evening of the 3d, moving eastward. This low area was accompanied by heavy rain throughout the state during the afternoon and evening of the 3d and changed to snow on the 4th. The low area of the 17th first appeared on the a. m. of the 16th in Montana and Northwest Territory and moved eastward, and was central over northern Michigan and Lake Superior on the morning of the 17th, and during the day the pressure slowly decreased, and rose steadily until the 22d. A low area appeared on the 31st which developed rapidly, and was accompanied by snow, turning to rain, on the evening of the 31st. A high area passed on the 24th and 28th, accompanied by decidedly cold weather.

Temperature (in degrees Fahr.).—The mean monthly temperature, 27.4, is 1.0 above the normal of thirteen years. The upper peninsula is 0.2 below the normal; the northern section 1.6 above the normal; the central section 1.0, and the southern section 0.4 above the normal. The highest temperature for the month, 66, was recorded at Coldwater, in the southern section, on the 4th, and the lowest temperature, -18.5, at Mottville, in the southern, on the 30th. The mean range of temperature is 50.7. The highest mean daily temperature, 50.0, was recorded at Sand Beach on the 4th, and the lowest mean daily temperature, 8° 0', was recorded at Calumet on the 28th. The warmest day was the 4th, when the mean temperature for the state was 40.0, and the coldest days were the 29th and 30th, the mean temperature being 12.0. Comparing this with the mean daily temperatures for December since 1875, it is

found that the highest mean daily temperature, 59.0, occurred on December 31, 1875, and the lowest mean daily temperature was -8.0, on December 29, 1880. The highest mean monthly temperature was, 37.2, in 1877, and the lowest, 17°.2, in 1876. Four cold waves passed over the state: on the 5th, 12th, 22d, and 28th, causing a fall in temperature of from 15.0 to 35.0 in each case, except the 10th, when the fall was but 15.0.

Precipitation (in inches and hundredths).—The average monthly precipitation for the state, 3.14, is 0.44 above the normal. The departures from the normal in the different sections are as follows: upper peninsula 0.27 above; northern section 0.82; central section 0.52, and the southern section 0.54 above the normal precipitation for thirteen years. The maximum monthly precipitation for December since 1875 was 4.85, in 1884, and the minimum monthly precipitation was 1.70, in 1880. The total rainfall for the year 1887 is 30.82, or about 5.2 below the normal. The average number of days on which .01, or more, of precipitation occurred was 13.1 for the state, 23.7 for the upper peninsula, 14.6 for the northern section, 12.3 for the central section, and 11.4 for the southern section. Greatest number of days of precipitation at any station was, 24, at Marquette and Gaylord; least, 4, at Romeo. The number of days on which rain or snow was recorded in the several sections will be found in the summary, for the state.

Wind.—The prevailing direction of wind for the month was southwest. The average total movement of the wind, in miles, was 7,916. The greatest movement, 10,969 miles, occurred at Mackinaw City, and the least movement, 6,103 miles, at Cassopolis. The maximum velocity of wind, 60 miles per hour, direction southeast, on the 31st, at Mackinaw City. High winds were recorded on the 2d, 4th, 9th, 21st, 28th, and 31st.

The "Mississippi Weather Service," Prof. R. B. Fulton, of the University of Mississippi, Oxford, director:

The mean temperature for the state for the past month was 46°, which is 2° in excess of the mean for December, 1886. The state was visited by four cold waves during the month, all of which were predicted by the United States Signal Service and were fully verified.

The average precipitation was 8.06 inches, which is 5.80 inches in excess of the average for this month last year. Average number of days on which rain fell, 13. The total amount of snowfall for the month occurred as follows: University, 0.7 inch; Palo Alto, 2.00 inches; Hermanville, 8.00 inches; West Point, 1.50 inches; Starkville, 4.50 inches; Jackson, 1.00 inch. Heavy rainfalls, one inch, or more, occurred as follows: 8.75 inches, at Jackson, on the 7th; 2.75 inches, at A. and M. College, on the 31st; 2.00 inches, at West Point, on the 31st; 2.70 inches at Hermanville, on the 7th; 2.04 inches, at Palo Alto, on the 31st; 2.18 inches, at Mobile, on the 8th; 1.59 inches, at Memphis, on the 31st; 1.89 inches, at Vicksburg, on the 31st; 2.65 inches, at Biloxi, on the 24th; 2.00 inches, at Batesville, on the 8th; 1.73 inches at Artonish Plantation, on the 31st.

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.02; maximum observed, 30.67, at Memphis, on the 29th; minimum observed, 29.81, at Vicksburg, on the 31st; range for state, 1.86; greatest local monthly range, 1.18, at Memphis; least local monthly range, 0.90, at Biloxi.

Temperature (in degrees Fahr.).—Monthly mean, 46; highest monthly mean, 51, at Mobile and Biloxi; lowest monthly mean, 41, at Memphis; maximum, 80, at Artonish Plantation, on the 4th; minimum, 14, at Memphis, on the 21st; range for state, 66; greatest local monthly range, 55, at Artonish Plantation; least local monthly range, 89, at Biloxi; greatest daily range, 35, at West Point, on the 20th; least daily range, 0, on the 21st, at Artonish Plantation.

Precipitation, including melted snow (in inches).—Average for the state, 8.06; greatest, 11.17, at Starkville; least, 5.80, at Memphis.

The "Missouri Weather Service," Prof. Francis E. Nipher, of Washington University, Saint Louis, director:

The average temperature for December throughout the state was 29°.1. The highest reported was 67°, at Pro Tem, and the lowest, 18° below zero, at Princeton, making a total range of 85° for the state. The average of minimum temperatures was 7°.2 below zero, and the average of maximum temperatures, 58°.6, making an average range of 65°.8. From the 27th to the 29th a cold wave extended over the state, reducing the temperature at all stations to a minimum below zero; another cold wave extended over the state from the 20th to the 22d, but it was not quite as severe as the other.

The average rainfall for December was 2.86 inches. It was fairly distributed over the state, the greatest amount having fallen in the southeastern portion and the least in the northwestern portion of the state. The greatest amount of rainfall reported was 4.12 inches, at Cairo, Ill., and the least, 1.60 inches, at Savannah.

At the central station (Saint Louis) the mean temperature was 32°.1, which was about the normal for December. The highest temperature was 57°.2, on the 3d, and the lowest, 2°.4 below zero, on the 28th. The total precipitation was 3.24 inches.

The "Nebraska Weather Service," Prof. Goodwin D. Swezey, of Doane College, Crete, director:

The month of December, 1887, has not been in any respect a marked month. The precipitation, which has been wholly in the form of snow, has been not far from normal. Over the greater part of the state it has been less than an inch, although the western end of the state and a strip bordering the Missouri River have had upwards of an inch, reaching two inches in the extreme northeastern

corner of the state. The average snowfall over southeastern Nebraska has been 5.7 inches, and the number of days on which it fell, six.

The only respect in which the temperature of the month has been unusual is the minimum temperature of the month, 28° below zero. During the past ten years it has only once fallen to -28° and once to -18°. The mean temperature has been 21°.6, which is about 1°.5 below the normal.

The "New England Meteorological Society," Prof. Wm. H. Niles, of the Institute of Technology, Boston, Massachusetts, president:

Reports for the month were received from one hundred and forty-seven observers.

The mean temperature for the month has been above the normal at nearly all stations, ranging from 3°.5 above the mean of twenty years at Concord, N. H., to 0°.2 below the mean of twelve years at Waterbury.

The precipitation has been in excess at all stations, except Boston, Amherst, and New Haven.

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.07 (twenty-three stations); maximum observed, 31.02, at Northfield and Newburyport, on the 1st; minimum observed, 28.88, at Block Island and Providence, on the 18th; range for New England, 2.16; greatest local monthly range, 2.08, at Providence; least local monthly range, 1.74, at Northfield.

Temperature (in degrees Fahr.).—Monthly mean, 28.4 (one hundred and six stations); highest monthly mean, 37.3, at Block Island; lowest monthly mean, 19.8, at Berlin Mills; maximum, 63, at Westborough, on the 11th; minimum, -30, at Woodstock, Vt., on the 30th; range for New England, 93; greatest local monthly range, 79, at Strafford; least local monthly range, 44, at Nantucket; greatest daily range, 50, at Lake Cochituate, on the 28th; least daily range, 1, at Lowell, on the 16th, and Randolph, on the 25th.

Precipitation, including melted snow (in inches).—Average for New England, 4.35 (one hundred and thirty-two stations); greatest, 6.50, at Shelton, least, 2.70, at Block Island.

Wind.—Prevailing direction, northwest (sixteen stations).

The "New Jersey Weather Service," Prof. George H. Cook, of the Agricultural College, New Brunswick, director:

Temperature (in degrees Fahr.).—Monthly mean, 38.7; highest monthly mean, 38.5, at Ocean City; lowest monthly mean, 30.3, at Hanover; maximum, 63.0, at Ocean City, on the 4th; minimum, 6.0, at Hanover, on the 1st; range for state, 57.0; greatest local monthly range, 53.0, at Hanover; least local monthly range, 41.5, at Atlantic City; greatest daily range, 35.0, at Hanover, on the 28th; least daily range, 2.0, at Newark, on the 16th. The mean temperature, 38.7, is 1.1 above the December normal.

Precipitation, including melted snow (in inches).—Average for the state, 5.29; greatest, 7.32, at Lambertville; least, 3.64, at Union. The average precipitation, 5.29, is 2.61 above the December average for the state.

Wind.—Prevailing direction, northwest.

The "North Carolina Weather Service," Dr. Herbert Battle, of Raleigh, director:

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 42.6; normal, 41.6; departures from the normal, +1; highest, 68.0, at Chapel Hill, N. C., on the 4th, lowest, 12.9, at Lynchburg, Va., on the 30th; highest on record, 78.0, in 1879; at Wilmington, N. C.; lowest on record, -5.0, at Knoxville, Tenn., and Lynchburg, Va., in 1880; range for the state, 55.1; mean daily range, 15.7.

Precipitation (in inches and hundredths).—Monthly average, 4.75; normal, 4.85; departure from the normal -0.10; greatest local daily rainfall, 3.10, at Hatteras, N. C., on the 10th; greatest monthly rainfall, 7.78, at Southport, N. C.; least monthly rainfall, 2.07, at Asheville, N. C.

Relative humidity.—Mean, 77.6 per cent.; normal, 73.6 per cent.; departure from the normal, +4.0.

Wind.—Prevailing direction, northeast.

The "Ohio Meteorological Bureau," Prof. B. F. Thomas, of the Ohio State University, Columbus, president:

Atmospheric pressure (in inches).—Monthly mean, 30.126; maximum, 30.906, at Canton and Hiram, on the 1st; minimum, 29.551, at Celina, on the 31st; range for state, 1.355; greatest local range, 0.691, at Wooster, on the 28th; least local range, 0.024, at Akron and Wooster, on the 24th.

Temperature (in degrees Fahr.).—Monthly mean, 31.8; highest monthly mean, 38.2, at Pomeroy; lowest monthly mean, 26.9, at Wauseon; maximum, 62.0, at Portsmouth, on the 4th, 5th, and 6th; minimum, -8.0, at Paulding, on the 30th; range for state, 70.0; greatest local monthly range, 64.0, at Paulding; least local monthly range, 46.0, at Oberlin; greatest daily range, 43.5, at Dayton, on the 28th; least daily range, 2.0, at Celina, on the 12th.

Precipitation, including melted snow (in inches).—Average for the state, 2.46; greatest, 4.88, at New Bremen; least, 1.11, at Oberlin.

Wind.—Prevailing direction, southwest.

"Oregon Weather Service," report prepared by B. S. Pague, Sergeant, Signal Corps:

Reports were received from twelve stations, covering the coast, the southern region, and the interior valleys, and also from The Dalles. The great "Inland Empire" (eastern Oregon) is not represented; the climate of this region being

entirely different from that of western Oregon. The prevailing characteristics of the climate of eastern Oregon are briefly these: extreme cold weather, with snow, in winter, the temperature recording as low as 20° below zero at places, and very warm and absolutely dry weather in summer.

In these reports, for the present, the climate of that portion of Oregon west of the Cascade Mountains only will be given. It is hoped that stations will soon be established in eastern Oregon, when the whole state will be represented.

The month was characterized by an excess of temperature and precipitation in the northern part of the state and along the coast, and by a deficiency of both in the southern part. The month opened with a well-marked storm off the mouth of the Columbia River. This storm was succeeded by a succession of light storms, giving almost constant rain until the 13th. From the 16th to the 23d, the weather was generally fair, broken by a light storm on the 24th, and by a severe storm on the 27th, which latter gave a copious rainfall and snow in the mountains.

Temperature (in degrees Fahr.).—The mean temperature for the state was 38.9; the maximum, 58, at Roseburg and Ashland; the minimum, 4, at Fort Klamath. The highest temperature occurred from the 1st to 13th, and the lowest from the 21st to 25th. Along the coast, in the Umpqua and Willamette valleys, the temperature was from 0.7 to 1.7 above the normal. In the extreme southern part of the state the temperature was from 2 to 5 below the normal. The last eleven days of the month were generally below the normal.

Precipitation (in inches).—The precipitation was from one to five inches above the normal along the coast and in the interior valleys, and about one inch below the normal in the southern part of the state. The greatest excess, 5.00 inches, occurred at Albany, and the greatest deficiency, 1.15 inches, at Ashland. For the season from July 1st, the precipitation is above the normal at Astoria and Albany, nearly normal at Roseburg, and below the normal in all the other districts; the greatest deficiency, 5.10 inches, being at Ashland.

Very heavy rains occurred in the northern part of the state on the 6th. Precipitation occurred on from ten to twenty-four days throughout the state.

The "Pennsylvania State Weather Service," report prepared under the direction of the Franklin Institute, Philadelphia, by Sergeant T. F. Townsend, Signal Corps:

The characteristics of the weather of December were similar to those of November in the general moderation of the changes of temperature and the absence of extremes. While the mean temperature of 31° 5 is very nearly that of the absolute mean, the general climate has been mild rather than severe. The equable temperature, and the absence of heavy snowfalls during the first and middle parts of the month, have been favorable for the continuance of building operations, plowing, and the usual out-door work performed at this season of the year. The month has been favorable to the growth of winter wheat, which is reported in excellent condition. The pasturage of the lower counties has been of value.

The coldest period of the month was from the 22d to the 31st, inclusive. The lowest temperatures reported were, Dyberry, —6°, on the 31st; Lancaster, —3° 8, 29th; Wysox, 0° 5, 31st; Phillipsburg, 0° 0, 1st; Scranton, 3° 5, 1st; Pittsburg, 7° 5, 29th; Philadelphia, 14° 5, 29th. The highest temperatures occurred on the 4th, 10th, and 11th, and ranged from 50° to 60°.

Most of the high barometric pressures were on the 1st, and the lowest on 17th and 18th. The latter was attended by general rains and snows, which were heavy east of the Alleghenies.

With the exception of the 1st, 6th, and 18th rain or snow fell in measurable quantities on every day of the month in some part of the state. The total precipitation has been very unevenly distributed. In many of the eastern counties there was an excess of 100 per cent., while in the western it ranged from normal to a deficit of from 80 to 50 per cent. The following are the greatest reported: West Chester, 6.81 inches; Pottstown, 6.50 inches; Quakertown, 6.05 inches; Blooming Grove, 5.80 inches; Philadelphia, 5.06 inches. The least are: Clarion, 1.49 inches; Oil City, 1.76 inches; Uniontown, 1.69 inches, and Meadville, 1.89 inches.

Several of the western counties report much inconvenience from the continued drought.

Snows occurred from the middle to the last of the month in variable quantities, amounting to a total of about two feet in some of the northern and eastern counties.

Owing to its being closely followed by rains, the snow was soon melted, and did not cause much interference with, or interruption to, travel. In the wooded districts of the state the snow has not been sufficient to enable the lumbermen to transport their logs and timber to the streams.

The prevailing winds have been from the northwest and southwest, with an absence of severe gales. More than the usual number of cloudy days have been reported. The weather summary for the month shows the following: cloudy, 16 days; fair, 9 days; clear, 6 days.

The "South Carolina Weather Service," Hon. A. P. Butler, Com'r of Agriculture for South Carolina, Columbia, director:

Most prominent during the month were the cold waves. The cold-wave signal orders, with but one exception, were fully justified, and the criticism on this particular branch is very flattering to the service, the signals having been ordered far enough in advance to satisfy all.

The areas of low barometer, appearing at different times during the month, brought with them rain, the largest amount falling in the state on the 24th of the month. The greatest amount of precipitation fell in the southern counties, and the least in the middle counties.

Summary.

Temperature (in degrees Fahrenheit).—Monthly mean, 44.9; highest monthly mean, 51.1, at Charleston; lowest monthly mean, 40.1, at Kirkwood; maximum, 76, at Spartanburg, on the 3d; minimum, 18, at Cheraw and Brewer Mines, on the 30th; range for state, 58; greatest local monthly range, 57, at Spartanburg; least local monthly range, 30, at Marion; greatest daily range, 39, at Cedar Springs, on the 3d; least daily range, 0, on the 9th at Belfast.

Precipitation, including melted snow (in inches).—Average for state, 4.65; greatest, 7.91, at Charleston; least, 3.31, at Stateburg; average number of rainy days, 9.7.

Wind.—Prevailing directions, northeast and east.

The following is an extract from the report of the "Meteorological Department of the State (Tennessee) Board of Health," prepared under direction of J. D. Plunkett, M. D., President of the State Board of Health, by H. C. Bate, Signal Corps, Assistant, Nashville:

The special features for December were the heavy rainfall of the 31st and the absence of any electrical disturbance except on that day.

The mean temperature was 38° 6, about the normal for the past five years, the greatest during that period being 42° 9, in 1883, and the least, 34° 6, in 1886. The highest temperature was 65°, recorded on the 8d and 6th, and was, by several degrees, the lowest December maximum during the period above-named. The lowest temperature was zero, recorded on the 29th, and was 8° above the December minimum of 1886, 12° above the December minimum of 1883 and 1886, and 1° above the December minimum of 1884. The ranges of temperature were less than the normal.

The mean precipitation for the month was 5.05 inches, nearly one inch above the December mean of the past five years. Of this amount, the eastern division received an average of about four and a half inches; the middle division a little more than five inches, and the western division nearly five inches. The greatest local precipitation for the month was 8.70 inches, at Fostoria, and the least, 2.06 inches, at Waverly. The greatest amount in twenty-four consecutive hours was 3.88 inches, at Lawrenceburg, from 4 a. m. to 11 p. m. on the 31st. The day of the greatest rainfall was the 31st, when an average of 1.60 inches of rain fell throughout the state. Up to this date there was quite a deficiency in the rainfall for the month. The greater portion of this rain fell in the middle division. With the exception of those of the 7th, 9th, and 31st, the rains during the month were mostly light. The 1st, 12th, 18th, 21st, 22d, and 29th were reported without measurable rainfall.

Snows were reported on the 17th, 24th, 25th, 26th, 28th, and 30th, and were generally light, the greatest depth reported being 4.50 inches at Greenville and Andersonville. Very little fell in the middle and western divisions. The snowfall during the year was very small compared with the four preceding years.

NOTES AND EXTRACTS.

OCEAN FOG PREDICTIONS.

[By E. B. GARRIOTT, Sergeant, Signal Corps.]

It is interesting to note that the comments which have been made in the WEATHER REVIEW on the subject of ocean fog have been consistent with the facts deduced from special fog reports made by shipmasters during the past fourteen months. This system of reports was inaugurated to verify the theory that in the passage of low barometer areas over or near the Banks of Newfoundland, meteorological conditions favorable to the precipitation of fog atoms are developed, and the reports of each succeeding month have not only verified the correctness of this theory, but have also served to establish the fact, to which few, if any, exceptions have been noted, that the development of fog near Newfoundland attends the circulation of winds in the southern quadrants of low barometer areas. With a knowledge of this fact the practicability of forecasting the presence of fog over the Banks is limited only by the difficulties which may attend the forecasting of the passage of low barometer

areas over or near that region. The extent to which these difficulties are surmountable can be readily determined by a study of the storms which first appear over the American continent or over the ocean west of the sixtieth meridian. Of the first-named class of storms it is known that those of marked energy commonly move eastward over the Gulf of Saint Lawrence or the Atlantic coast to the southward; in the case of storms of tropical or sub-tropical origin which advance along the course of the Gulf Stream, it has been found that their progress is usually indicated by telegraphic reports from coast stations. The storm-track charts also show that the normal paths of all storms which develop west of the sixtieth meridian traverse the region which embraces or immediately adjoins Newfoundland and the Grand Banks. It would therefore appear that of the preliminary knowledge necessary to the successful making of fog predictions there remains to be determined, through the experience and current work of the Signal Office, the storms which, appearing over the interior of the country, are likely to move eastward over the coast line, or, on being located off the lower coast, possess sufficient strength to